THE ZOOLOGIST.

THIRD SERIES.

Vol. VI.] JUNE, 1882. [No. 66.

ON THE BREEDING OF THE OTTER.

By A. H. Cocks, M.A., F.L.S.

In the 'Proceedings of the Zoological Society' for February last I gave some account of the breeding of a pair of Otters in my possession, and as I am now able to add some supplementary notes of interest I may perhaps be allowed to preface these by briefly recapitulating the substance of my former communication.

A female Otter was sent to me in March, 1873, from North Wales, as a cub of about 2¾ lb. weight, with the permanent incisor teeth just cut. From about the time she was full-grown she came in season nearly every month; but I never possessed an adult until October, 1879, when I obtained one in Hamburg. Owing to the female animal's extreme jealousy, I was not able to let them run together until they had been duly introduced to each other through the bars of adjoining cages for some weeks. Early on the morning of July 17th they paired in the water, the female loudly chattering, or whistling, in a peculiar way all the while. They remained thus for about an hour; and the sides of the tank being perpendicular, they were of necessity swimming the whole time, Nothing further was noticed until the morning of August 12th, when they again paired in the water. They remained together on this occasion for an hour and a half.

On October 2nd, the female being evidently with young, I separated the animals; and (about 5.45) in the afternoon of the 12th I heard young ones squealing; in all probability they

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had not been born more than an hour or two when I discovered them. Reckoning from August 12th (the date of the second pairing), the gestation was therefore sixty-one days. We constantly heard the cubs squealing; but nothing was seen of them until the 25th, when I looked at them, and found them to be two in number, measuring about eight inches in length, including the tails, which were about two inches, or perhaps rather more, in length, and which were curved tight round on the abdomen, as in a fœtus. They were completely covered with a fine silky coat, very different from the somewhat rough "puppy-coat" they afterwards assume. They were still blind, with the eyes very prominent. Within two hours after I had looked at them the mother removed them to the other bed-box. From this time they were frequently shifted by the mother from one box to the other, often daily, the longest stay in one box being from October 28th to November 15th.

On November 17th, while I was in the act of putting clean straw into the unoccupied bed box, the Otter came out of the other box with one of the cubs in her mouth, and, swimming with it across the tank, came right up to the box I was filling, as if totally unconscious of my presence. On finding that the bed was not ready, she swam back with the cub across the tank; and, although I left the tank as quickly as possible, she made altogether about six journeys across the tank (which is between thirteen and fourteen feet long), holding the cub by the neck in her mouth, and carrying it most of the way under water. I could not be sure about its eyes, but believe it to have been still blind. It appeared to be then about fifteen inches long, or possibly hardly so much, On the 29th the cubs were about one foot long in head and body, with tails six inches long. Weight probably about two pounds. Eyes open.

On the night of December 5th one of the cubs first showed itself, lying with its head hanging out of the box. On the 9th the cubs first came out of their own accord, and went into the water several times (both accidentally and purposely it was supposed); the tank being nearly brimfull, they were able to get out without assistance. On the 10th I first saw the mother carry fish into the box to try to tempt the cubs to eat. In the afternoon of the same day the cubs were anxious to come out of the box; but the mother, hearing the gardeners at work close by, would not allow them. Presently, one of the cubs having become very refractory, the old Otter seized it by the side of the neck, carried it to the tank, and gave it a thorough ducking, and thence straight back to bed, where, after another short demonstration of independence, it subsided. On the 12th one of the cubs when out, being frightened at an accidental noise, plunged without hesitation into the tank, and swam across nearly all the way under water.

On the morning of December 13th, on my feeding the old Otter while the cubs were out with her, she took two small roach to them, and tried to make them eat, taking first one fish, then the other, then both together in her mouth, and moving them about close in front of the cubs to attract their attention, at the same time uttering a peculiar whine or growl, or something between the two, which sounded ferocious. This she continued to do every day up to January 15th. On this first occasion, though they occasionally gnawed at the fish, they appeared to get nothing off.

On December 28th I turned out the cubs to exhibit: they had now become shy, and bit fiercely. On the 31st, about 11.15 p.m., I found the cubs out, and calling, as if hungry; so I gave them a supply of food, which they appeared to appreciate. They continued from that date to expect some food the last thing each night, in addition to a meal about 6 p.m. About the same date they began to eat a little the first thing in the morning; but would lie up all through the day, and the mother, when fed at other times than those specified, made no attempt to induce them to eat.

On January 25th they came out an hour earlier than usual (5 p.m.); and continued gradually to come out earlier, until February 20th, when they were out as early as 2.20 p.m.

I could not satisfy myself as to how long they suckled, but believe they continued to do so all through the spring—of course in addition to a more solid diet.

I parted with one of the cubs in June, for "a good consideration," they being by that time nearly full-grown. Early in July I went abroad, and on my return, at the end of September, I found the remaining cub quite full-grown, and was told that she had been in season during my absence—probably during August, or when she was ten months old.

The mother (now more than nine years old) and daughter continue to the present moment in apparently the best possible health, but I have been unlucky enough to lose the male, from blood poisoning—the effect, I believe, of the extreme cold of the early part of last year acting upon an abscess at the root of one of the lower premolars, and causing the mischief to spread to a fatal extent. My hopes of again breeding Otters are therefore for the present at an end.

ORNITHOLOGICAL NOTES FROM NATAL.

By Majors E. A. Butler and H. W. Feilden, and Capt. S. G. Reid

(Continued from p. 171.)

Pandion haliaëtus (Linn.), Osprey.—One seen at the mouth of the Umgeni River, near Durban, on the 24th and 26th December, by Reid. On the 26th this solitary individual flew quietly up to within a few yards of him and picked up a wounded Kingfisher, *Ceryle rudis*, which he had just shot, from the water, flying off to a neighbouring post to make a meal of it.

Bubo capensis (Daud,), Cape Eagle Owl.—A female shot near Newcastle by Feilden on June 5th.

Bubo maculosus (Vieil.), Spotted Eagle Owl.—Common everywhere, frequenting rocky krantzes near streams. Butler took eggs from a ledge among rocks near Newcastle on the 30th June, and contributes the following note:—"Shot a hen bird off the nest on the 1st June; the three eggs, which were incubated, were in a sandy depression of the ground on a ledge of rock, with a bush growing out of the rock in front that concealed the eggs from view. The rocks were on the top of a low hillside, and almost perpendicular for about fifteen or twenty feet at the spot where the nest was found, with a slope of grass for about a hundred yards below. The following day on revisiting the place I found another pair there, but I do not think they bred." A female obtained at the Horn River on the 22nd July, had eggs considerably enlarged in the ovary; another female shot near Richmond Road Camp on December 5th showed no signs of breeding. Iris brilliant pale yellow (B).

Scops capensis (Smith), Cape Scops Owl.—Butler obtained a single example of this rare little Owl in the Drakensberg kloofs near Newcastle on the 23rd August. It was a female, and was sitting in a tree, mobbed by a number of small birds. Iris pale yellow; feet and bill leaden-grey.

Asio capensis (Smith), African Short-eared Owl.—Very common in the grass-grown edges of the "vleys" in the neighbourhood of Newcastle. Five or six may be seen on the wing together at times. A pair obtained on the 18th May showed unmistakable signs of breeding, but no nest was found.

Strix capensis (Smith), South African Grass Owl.—Common, but not so numerous as the preceding species, in company with which it is found among the long dead grass near "vleys," or small streams, in the Newcastle district. Reid found a pair at Richmond Road Camp, near Maritzburg, on the 5th December, and obtained the female. The ovary contained three enormously developed eggs, the largest as big as an average-sized grape; she was evidently just about to nest. This time is at variance with that in Layard's description (Atmore, *in epist.*), where a nest contained large young birds on the 26th May, but our experience of the breeding of South African birds shows that no reliance can be placed on any given dates for nests. Birds seem to breed in the most erratic fashion, independent of seasons and state of plumage. A male shot by Butler on the 28th September had the iris blackish brown; bill livid white, inclining to pink at the base; feet slate-colour.

Strix flammea (Linn.), Barn Owl.—Reid shot a female near Camperdown Station on December 15th. When first discovered it was sitting in a dense bush at the bottom of a deep "donga," or ravine.

Caprimulgus europæus, Linn., Common European Nightjar.—One, a male, obtained on the stony bed of a "donga" at Camperdown on the 15th December (R).

Cypselus apus (Linn.), Common Swift.—Seen in considerable numbers at Durban and Maritzburg in April; one was noted at the latter place on the 15th August, and it was common there on the 30th of that month (R). Towards the middle of September Swifts made their appearance in the neighbourhood of Newcastle, where they were afterwards common. They must breed, in our opinion, in the crevices of the rocky ravines, otherwise why should they choose their particular spot, fly constantly in and out of it throughout the day, sometimes remaining there for a long time, screaming loudly the while? In Tiger Kloof, near Newcastle, Reid found them numerous, and all apparently nesting. One pair kept flying in and out of a hole in a rock just out of his reach, regardless of his presence, and appeared to have young. This was on the 11th November.

Cypselus caffer, Licht., African White-rumped Swift.—First observed near Newcastle on the 27th October, afterwards fairly common. Seen at Tiger Kloof in considerable numbers on the 11th November, in company with *C. apus*. A pair were breeding in a nest stolen from *Hirundo cucullata* in the verandah of Mitchell-Innes' Hotel, at Sunday's River, on the 17th November.

Cypselus melba (Linn.), White-bellied Swift.—Visits the north-western portion of the colony in considerable numbers, appearing there early in September. As with *C. apus*, it is more than probable that they breed during their stay in South Africa, for Reid shot a female with eggs very much enlarged on November 4th, on the Incandu River. See Layard's remarks on this question, in the 'Birds of South Africa,' both editions. Many of these fine Swifts were seen daily in the vicinity of Fort Napier, Maritzburg, between the 12th and 25th April, making their appearance regularly every morning in company with *C. apus*. Six were observed flying about the city of Maritzburg on the 23rd August (R).

Alcedo semitorquata (Swains.), Half-collared Kingfisher.—Not common near Newcastle. One was shot by Lieut. Giffard, of "The Welsh" Regt., in September, and others were seen occasionally along the upper waters of the Incandu and its tributaries (R).

Corythornis cyanostigma (Rüpp.), Malachite-crested Kingfisher.—Exceedingly common on all the rivers, skimming along like a little ball of blue fire just above the surface of the water.

Ceryle rudis (Linn.), Pied Kingfisher.—Common on the Incandu and other streams in the Newcastle district, and observed at Rorke's Drift (breeding), Colenso, Estcourt, &c.; in fact, it seems generally distributed throughout the colony. Reid found two pairs at the mouth of the Umgeni, near Durban, in December.

Ceryle maxima (Pall.), Great African Kingfisher.—"While I was crawling through the bush at the mouth of the Umgeni River, on the 24th December, in a vain attempt to stalk a wily Curlew in the lagoon, one of these enormous Kingfishers flew just over my head, but I had not time to get a shot at him" (R).

Ispidina natalensis (Smith), Natal Kingfisher.—Several times observed in December in the bush near the mouth of the Umgeni, perching indiscriminately on trees, telegraph-wires, and stalks of reeds overhanging the ponds. When approached it disappeared into the bush. One seen at Colenso on the 20th November (R).

Halcyon albiventris (Scop.), Brown-hooded Kingfisher.—One shot by Sergeant Williams, of "The Welsh" Regiment, near Ladysmith, in the winter months (R).

Upupa africana, Bechst., South African Hoopoe.—One shot at the Ingagane River on July 9th; four seen at Guinea-fowl Kopje, near Ladysmith, on August 21st (specimens afterwards obtained there by Lieut. Harkness, of "The Welsh" Regt.); two or more at Blaauw Krantz River on November 22nd, where Butler also observed it. Seen at Pietermaritzburg by Mr. Chapman on August 30th, and by Mrs. Savile Reid about the middle of September (R).

Rhinopomastes cyanomelas (Vieil.), Scimitar-billed Wood Hoopoe.—One obtained in the winter near Ladysmith by Sergt. Williams, of "The Welsh" Regiment (R).

Colius striatus, Lath., Cape Coly.—Obtained by Reid at Estcourt, where they were not uncommon, in April, and at Durban in December.

Cuculus solitarius, Stephens, Red-chested Cuckoo.—Butler obtained a single specimen of this bird, sitting on a bush in the open "veldt" near Newcastle, on September 27th, but observed no other specimens. Developed for breeding: iris dark brown; legs and feet yellow; orbital skin lemon-yellow; bill blackish, greenish yellow at base of lower mandible and at gape; inside of mouth yellow.

Chrysococcyx smaragdineus (Swains.), Emerald Cuckoo.—One shot by Lieut. Jenkin Jones, of "The Welsh" Regt., a short distance from Newcastle, on October 22nd (R). Butler heard of several others being killed by men in the Natal Mounted Police between Colenso and Maritzburg.

Coccystes glandarius (Linn.), Great Spotted Cuckoo.—"I shot the only one I ever saw in Natal, a male breeding, at Blaauw Krantz River, on November 23rd" (R).

Coccystes jacobinus (Bodd.), Black and White Cuckoo.—A pair seen and the male obtained, at Blaauw Krantz River, on the 23rd

November (R). Butler noticed it on one occasion near Newcastle, and on two or three other occasions about Colenso in November.

Centropus natalensis, Shelley, Lark-heeled Cuckoo.—A female in wretched plumage, but with eggs considerably enlarged, obtained in the bush between Durban and the Umgeni River on December 24th. Another, probably the male, seen but not procured (R).

Indicator sparmanni, Stephens, White-eared Honey-guide.—Butler shot a female specimen, developed for breeding, in a kloof on the Drakensberg, near Newcastle, on October 9th. It was on the ground at the time, pecking at a large piece of the comb of a wasp's nest. He observed another one at the same place a few days later, and noticed the species also at Blaauw Krantz. Legs and feet plumbeous; iris brown; bill dusky plumbeous.

Pogonorhynchus torquatus (Dum.), Black-collared Barbet.—Lieut. Harkness, of "The Welsh" Regt., obtained a specimen near Ladysmith in the spring (R).

Geocolaptes olivaceus (Lath.), Ground Woodpecker. — Exceedingly common, especially in the upper portions of the colony. Specimens obtained in all stages, and a nest taken by Butler on August 2nd, which he describes in the following note:—"Aug. 2nd found a nest containing four fresh eggs. The nest-hole was bored in soft earth on the face of a precipitous rocky bank or cliff overlooking a running stream. The eggs were laid in a depression of the ground about one foot and a half from the entrance. The passage inclined slightly upwards. No attempt at a nest. Bill dusky slate; legs and feet greenish plumbeous; iris whitish pink." Fond of perching in twos and threes, sometimes in family parties of five or six, on a big rock or ant-hill, the head and neck only visible to the intruder.

Dendropicus menstruus (Scop.), Red-vented Woodpecker.—"Lieut. Giffard and I obtained one, a male, on the 19th June, in a kloof underneath the Drakensberg, not far from the Leo Kop Mountain" (R). Butler obtained two or three specimens also in a kloof on the Drakensberg, near Newcastle, in August.

Dendropicus fulviscapus (Ill.), Cardinal Woodpecker.—Butler mentions a pair that were shot by an officer in his regiment, on the march down country in November, at Blaauw Krantz.

Yunx pectoralis, Vigors, Red-breasted Wryneck.—"A pair shot, and others seen, by Lieut. Harkness, near Ladysmith, in

November. Common along the Tugela at Colenso, where I obtained specimens, the same month" (R).

Turdus guttatus, Vigors, Natal Thrush.—"I was shown a specimen of this Thrush at Durban, in December, which had been obtained in the bush, not far from the coast" (R).

Turdus olivaceus, Linn., Olivaceous Thrush.—Appears to be universally distributed. Butler obtained four, all males, in the Drakensberg kloofs, near Newcastle, in August, three of which were developed for breeding. In some the legs and feet were brownish yellow, but in the adults yellow. Iris brown; bill brown above, yellow below. In some the upper mandible was partly yellow also. Reid shot a male in the bush, close to the beach, at Port Natal, on August 25th, and another, also a male, in the Drakensberg (Newcastle), on September 19th.

Chlorocichla flaviventris (Smith), Yellow-breasted Bulbul.—Several seen, and one obtained, in the bush close to the town of Durban, on April 9th (R).

Andropadus importunus (Vieil.), Sombre Bulbul.—One, a male, breeding, obtained near Camperdown Station, on the 15th December (R).

Pycnonotus layardi, Gurney, Black-eyebrowed Bulbul.—Common everywhere. All our specimens are alike in having the black unwattled eyelid. "Capt. Watkins, R.E., and I took a nest containing three lovely eggs near Richmond Road, on the 7th December. It was built in the fork of a small mimosa, and very badly concealed from observation. I found these birds unusually tame in the bush near Durban at the end of December; they remained perched on the telegraph-wires, a few yards from passing carriages and pedestrians. I did not shoot one, but presumed they were males watching over their sitting spouses" (R).

Crateropus jardinii, Smith, Jardine's Babbling Thrush.—"Lieut. Harkness, of 'The Welsh' Regt., shot one near Ladysmith in November, and kindly presented it to me" (R).

Monticola rupestris (Vieil.), Cape Rock Thrush.—Found commonly in the kloofs at the foot of the Drakensberg, near Newcastle, and evidently breeds in that neighbourhood.

Monticola explorator (Vieil.), Sentinel Rock Thrush.—Numerous in all parts of the Newcastle district, frequenting the stony "kopjes," throughout the winter, but only a few scattered pairs remained to breed. Shy and retiring at first, they soon got accustomed to the presence of strangers, and we could have obtained dozens if we had wished.

"At the Ingagane, when I was engaged in building some forts, these birds gradually got so tame that they would sit on the rocks within a few yards of the working party, darting eagerly down on the insects disturbed by the removal of the smaller rocks for building the walls. A pair took up their quarters in the rocks close to my tent, and used to come within a few feet of the door while I was sitting writing within" (R). Butler considers this species much more closely allied to *Saxicola* than to *Petrocincla*. It frequents the open country, and in habits and appearance in the field it is truly Saxicoline.

Cossypha caffra (Vieil.), Cape Chat Thrush.—Obtained at Newcastle by Butler, also by Lieut. Giffard, "The Welsh" Regt. Lieut. Harkness, of the same regiment, obtained it at Ladysmith (R). It is common and breeds in all suitable places in that locality.

Myrmecocichla formicivora (Vieil.), Southern Ant-eating Wheatear.—Exceedingly common after passing Estcourt. One of the most characteristic birds of the dreary, treeless "veldt," the monotony of which it does much to relieve. Though not difficult to get near, they keep the best possible look-out from the tops of the ant-hills, and it is exceedingly hard to find their nests. Butler obtained a single white egg, measuring 0·90 by 0·70 in., from one nest near Newcastle, on September 7th, and Reid found two nests containing young birds. Butler's nest was in a hole in an ant-hill, composed of dry grass and rubbish, but the two latter were in tunnels or holes (whether made by the bird or not is not known) in the sides of holes excavated by the Ant-bear. Often seen in family parties on an ant-hill after the young are hatched; the young are browner and dingier-looking than the old birds. Their flight is straight and rapid, and it quite startles any one unacquainted with their habits to see them suddenly check themselves and drop like a stone from a height of several feet on to a convenient rock or ant-hill, with a shock sufficient apparently to break every bone in their little bodies. The males sing very prettily at times, both stationary and on the wing, the note being loud and rich. An ant-hill recently broken into by an erratic ox-waggon or by an Ant-bear is a sure find for them. When wounded they go to ground like a rat if there is a hole near.

Saxicola galtoni (Strickland), Galton's Chat.—One obtained out of a pair seen by Reid, near Ladysmith, on August 21st.

Saxicola pileata (Gm.), Capped Wheatear.—A familiar bird in the vicinity of habitations throughout the district, preferring the more level "veldt" and the society of man to the hill-sides and boulder-strewn "kopjes" patronised by the two succeeding species. Nests about September in rat-holes, frequently choosing one close to a frequented road or path. The sexes are alike in plumage.

Saxicola bifasciata (Temm.), Buff-streaked Chat.—Plentiful in the neighbourhood of the Drakensberg, at the foot of the slopes, breeding there in considerable numbers. Butler obtained some beautiful specimens in breeding plumage on October 20th. Lieut. Giffard took a nest containing two incubated eggs near Newcastle, on or about the same date. They appear to winter in the same situations, for Reid observed several, and obtained one, at the Ingagane River on June 7th.

Saxicola monticola (Vieil.), Mountain Wheatear.—Almost as common on the rocky hills as *M. formicivora* is on the "veldt." Like *Monticola explorator*, they are very shy on first acquaintance, but soon acquire confidence if unmolested. Their song is pretty, though not very often heard. Many nests were taken in the neighbourhood of Newcastle; in most cases the complement of eggs was only three; pale bluish green, spotted with brownish rufous at the larger end; they measure 0·90 by 0·65 in. The plumage of the male is subject to great variation; the ordinary type, or rather what we believe to be the *first* breeding dress, being that given in Sharpe's edition of Layard's work. As the bird gets older the black of the head changes gradually to grey, followed by that of the back and under parts, so that an old male has the greater part of the plumage grey. We saw several in this strikingly handsome plumage paired with the ordinary white-tailed black female; the latter does not appear to undergo any such modifications of colouring. It seems clear that the grey colour is not, as stated in the first edition of Layard, a sign of immaturity, for no females were ever observed with any grey at all about them; and, moreover, young birds just out of the nest and barely able to fly, seen on the 26th October, were dull black, without the faintest trace of grey. We suspect that an examination of the series of skins of this species in all stages of plumage, which we have placed in Capt. Shelley's hands, will lead to the lumping together of two or three species that have hitherto been regarded as distinct. Butler adds the following notes on its nidification:—

(1) "Found a nest on the 10th September, near Newcastle, containing two fresh eggs, and the fragments of another that had been broken. It was built on the side of a hill under a slab of rock overlooking a running stream about twenty yards below, and consisted of fine dry grass, roots, &c., neatly put together, and well lined with sheeps' wool, horse and cow hair, &c., the whole being supported by a strong embankment of short pieces of coarse stems, grass-fibres, roots, lumps of dry earth, &c., matted together, and extending some eight or ten inches from the edge of the nest, so as to suit the slope of the ground. Eggs pale green, well marked with chestnut-red and with a few faint purplish markings as well, chiefly at the large end, forming a conspicuous confluent cap."

(2) "Another nest, under a ledge of rock, October 1st, containing three fresh eggs. The nest was similar to the one described above, consisting of moss and dry grass, well lined with cow-hair, wool, &c., but the eggs were more richly marked. After taking the eggs I threw the nest on the ground, and two days afterwards I noticed the old birds removing the *débris* to a fresh site under another rock, about twenty yards off. On the 12th October I returned to the spot, and found the nest finished and containing three slightly incubated eggs, which I took."

Pratincola torquata (Linn.), South African Stonechat.—Universally distributed and very abundant. Butler thus describes the nidification:—"Snared a hen bird on the nest, 11th Sept. The nest, which was placed under a tussock of grass on a bank overlooking a stream, was a neatly built structure, composed principally of dry grass, and lined with rats' fur, cow-hair, and a few feathers, being prolonged on the outer side for six or seven inches, so as to form a sort of embankment to suit the slope of the ground. Eggs three, fresh, pale green, somewhat faintly marked with light chestnut or fawn-colour, the markings being confined chiefly to the large end, forming a cap or zone. Two more nests, precisely similar, on the 14th of the same month and the 22nd October respectively, one containing five fresh eggs, the other three fresh eggs."

(To be continued.)

THE BIRDS OF BRECONSHIRE.

By E. Cambridge Phillips,
Member of the Woolhope Naturalists' Field Club.

(Continued from p. 50.)

Before concluding my notes on the game-birds, it will be interesting to state that a few years since two very curious hybrids were killed in the neighbourhood of Builth—a cross between the Pheasant and Black Grouse. Both have been preserved, and are now in the possession of a gentleman in that town. A friend of mine who has inspected them tells me that they partake of the shape and plumage of both parents in a marked degree, and that the cross is distinctly visible; he also says that they are apparently birds of the year.

Collared Pratincole, *Glareola pratincola.*—One of these curious birds was seen near Hay, in Breconshire, some time since by the brothers of Mr. Baskerville, of Clyro Court. They are quite certain it was the Collared Pratincole, for it alighted several times, and allowed them to walk close to it. They knew the bird well, as they had both been stationed in South Africa, where they had often observed it.

The Stone Curlew, *Œdicnemus crepitans.*—We have not this bird with us, nor have I ever heard of its being seen here, although one would imagine that our hills were well suited to its habits.

Golden Plover, *Charadrius pluvialis.*—Resident with us; it breeds sparingly on some portions of the Eppynt hills, and on the hills between Llanafawfawr and Nantgwilt it breeds in some numbers. It also breeds on the range of hills stretching from the Sugar Loaf, near Llanwrtyd, to Llanafanfawr. Occasionally it comes down to the lowlands, but very seldom; it is essentially a bird of the hills. In the severe winters of the last and preceding years large flocks frequented the fields at Newton, close to Brecon, and remained for a considerable time.

Lapwing, *Vanellus cristatus.*—Very common with us all the year round; it breeds all over the county. The Welsh call it by the appropriate name of "Cornicell" (the bird with the little horn).

Dotterel, *Endromias morinellus.* — A friend of mine has seen this bird near Abergwessin, and I was recently shown a beautifully stuffed specimen that had been shot in the adjoining county of Cardigan. It is very rare in this part of the county.

Greenshank, *Totanus glottis*.—Also very rare. I have seen it once, and only once, and that was on the banks of the River Usk, about two miles above Brecon, running along a little sandy beach. I was fishing at the time, and watched it for some minutes before it was aware of my presence, when it quickly flew away. Mr. David Thomas, of Brecon, has a stuffed specimen in his collection that was killed near this town.

Common Redshank, *Totanus calidris*.—Very uncommon with us, and, in fact, is considered quite a rarity; occasionally, however, one is killed. In the autumn of 1880 one was shot, by a gentleman living in Brecon, on the Eppynt Hills; it was a young bird of the year, and it is therefore quite possible that it was bred somewhere near the spot where it was killed. The Welsh name is "coesgoch" (red-leg).

Common Sandpiper, *Tringoides hypoleucus*.— As its name denotes, is most common with us, especially on the banks of the Usk and Wye, where it breeds; it is also to be found on most of our smaller streams. It is very tame during the breeding season, and its beautiful flight and twittering wailing cry form a pleasing accompaniment as with rod in hand you follow the windings of our beautiful rivers.

Knot, *Tringa canutus*.—The only instance I can quote of its occurrence here is a specimen killed near Hay, most probably an exhausted migrant.

Woodcock, *Scolopax rusticola*.—Our county has long been celebrated for its Woodcock-shooting, but alas! it is but too true that the Woodcock gets scarcer and scarcer each succeeding year. I think the two last hard winters have considerably lessened their numbers. The season 1881-82 was the worst for Woodcocks I ever remember. In beating a large cover for Woodcocks in February last I only flushed a single bird, where in years past I have often found a dozen, it being a favourite place for them early in the year. I have never with certainty known of its nesting with us, but Mr. David Thomas, of this town, has a very small Woodcock of an entire light fawn-colour, without any bars whatever, that was killed in this county some years since, and which has all the appearance of a young bird about three parts grown, and therefore must have been hatched here.

Great Snipe, *Gallinago major*.—Occurs oftener with us than is generally imagined, being regarded by many people as merely a very fine Common Snipe. About six years ago I flushed what appeared to me a very large Snipe on a bog on the Eppynt Hills. It made no noise on rising, and on my missing, it flew steadily and slowly for about one hundred yards, when it pitched again. I killed it on flushing it the second time, and found it to be the Great Snipe, a bird of the year. On the large bog at Oullwyn in September, 1880, I had just knocked down a Common Snipe, which my retriever was bringing, and on taking it from her a splendid Great Snipe rose at my feet, and flew, very like a Woodcock, slowly away; all my efforts to find it again were unavailing, although it must have settled out close by. Mr. Alfred Crawshay has killed this bird at Llangorse in August, 1876, and a man at Senny Bridge, who showed me a particularly large Snipe that he had killed near Cray about five or six years ago, seemed quite astonished when I informed him that it was a Great Snipe.

Common Snipe, *Gallinago media*.—Breeds commonly on the various bogs on all the hills in the county. Last season when flapper-shooting on a large bog in the neighbourhood of Devynnock, on August 1st, I killed seven Snipe, all young birds, which may, I think, fairly represent the average number of young birds that may be killed on any large bog in the county at this time of the year. The Snipe, however, on the whole, are not nearly so numerous in the winter season as they were. As with the Woodcock, the last two severe winters played sad havoc in their ranks. They are plentiful on the many bogs on the Eppynt Hills, and I know nothing more delightful than to wander with dog and gun on a fine November day, after rain, over these beautiful hills, now picking up a few Snipe, then a Duck or Teal, sometimes a Cock or two, often a Golden Plover, and listening to the cry of an old cock Grouse, as he springs whirring up far out of reach. The largest bag of Snipe I ever made on these hills was seven couple. The Welsh name for the Common Snipe is "giach," and as pronounced in Welsh admirably expresses the sound it makes on rising.

Jack Snipe, *Gallinago gallinula*.—Very common with us, especially during the season 1881. I think this bird stands the severe cold better than the Common Snipe, and is, as its French name implies, of a more sluggish nature, and consequently usually in excellent condition. A gentleman in this town who had been shooting over one of the large Snipe bogs near Trecastle in December last, told me that his party had moved from thirty to forty Jack Snipe in one day. This little bird has a very strong scent; most dogs hunt them with eagerness, and pointers and setters usually stand them with great staunchness.

CURLEW, *Numenius arquatus.*—Breeds very generally with us on most, if not all, of our hills, making its appearance with great regularity about the middle of March, and going away again—I think to the sea-side—before or by the 1st September. Miss Lloyd, of Llandefailog, tells me that this year the Curlews have come to their breeding places earlier than their usual time. They are certainly on the increase, and I think that being protected in this county from the 1st March to the 1st August may, in a great measure, account for this. The Curlew is a bold bird in the breeding season, when, like many other birds, it seems to throw off its exceeding caution. I once saw a Curlew make a very determined attack on an old Carrion Crow that was probably on the look-out for one of its young ones. The Crow stood no chance against the Curlew, with its grand free flight, and was soon beaten off and pursued until both were close to me. The exceedingly appropriate name of the Curlew in Welsh is "Chwibanog-y-mynydd" (the whistler of the mountain).

The Whimbrel, *Numenius phæopus*, is unknown in this county.

COMMON CRANE, *Grus cinerea.*—Although now, of course, extinct, yet I think it must have formerly occurred here in years gone by in some numbers, from the fact that the Welsh, both here and in Carmarthenshire, invariably call, in English, the Heron a "Crane"—indeed I never remember hearing a native call the Heron by any other name. The Welsh for Crane, as given in Richard's Dictionary, is "Crychydd," but he does not apply this word to the Heron, although two of the other names of the Crane and Heron are identical in Welsh; still I always hear the Heron called "Crychydd" by the Welsh both here and in Carmarthenshire, and this would lead one to believe that the name of the Crane had in some way descended to the Heron, and although this is far from conclusive as to the former occurring here, still I think it is well worth noticing.

HERON, *Ardea cinerea.*—Very general everywhere on all our rivers and streams. It breeds sparsely in scattered pairs all over the county; sometimes there are two or three nests in the vicinity of each other, but we have no regular heronry in the county, and numbers must go elsewhere to breed. Formerly there was a heronry at Llwynwormwood Park, near Llandovery, Carmarthenshire, about twenty miles from Brecon, as the Crow—or rather the Heron—flies, but from some inexplicable cause, and without any apparent reason, about fifteen years ago this heronry suddenly broke up into two parties, one going to Neuadd-fawr, Cilcwm, near Llandovery, the residence of Mr. Campbell Davys, where they still are, and now number about one hundred birds, and the other, and smaller portion coming to Bailyddu, Llandilofan, in the county of Brecon, where, however, they did not stay long, but no doubt gradually distributed themselves over the county. The distance from Llwynwormwood to Neuadd would be about six miles, and to Llandilofan about twelve miles. I am indebted to my friend Col. Jones, of Velindre, Llandovery, for the above interesting particulars. The severe weather of January, 1881, was most fatal to the Herons. In looking for Woodcocks in that month, on one of the coldest days I ever remember, I moved a splendid cock Heron from a spring, or as it is called here a "soak," near the Gludy Lake. Happening to be in the same place a few days after, I found one (probably the same bird) dead from starvation. About the same time I also saw another Heron dead from the same cause on the banks of a pond at Penlan, close by Brecon. A very small colony of Herons have bred in a wood near Senny Bridge for many years, but their nests never seem to increase beyond half-a-dozen. These birds, I am glad to say, have a very easy time of it here, not being often molested, as if killed they are seldom or ever eaten.

Purple Heron, *Ardea purpurea*.—Has once been killed in the county, near Talybont. The gentleman who shot it told me there were three together on the River Usk, near this place. This specimen, which has been preserved, I have had the pleasure of inspecting, and a beautiful specimen it is.

Squacco Heron, *Ardea comata*.—One of these unusually rare visitors was shot by Capt. Hotchkis on the River Wye, near Hay, in Breconshire, on May 3rd, 1867, and is now in the collection of Mr. Baskerville, of Clyro Court, Hay, who has kindly favoured me with these particulars.

Bittern, *Botaurus stellaris*.—If ever there was a county that formerly echoed with the "boom" of the Bittern, it must have been Breconshire; now, however, it is scarce. Still a great many have been killed in various parts of the county from time to time. Mr. Gwynne Holford shot one at Llangorse Lake some years ago, and several have been killed there since. Near Llandulas Church, situate in the most wild and desolate part of the county, and which is hunted by Col. Jones, of Llandovery, with his excellent pack of harriers, there are several rushy bogs, and not long since in one of these the Colonel when hunting constantly flushed a Bittern; it did not fly far, but settled again close by. As it seemed to have a decided attachment to the spot I hope it is still in the neighbourhood. The feathers of this bird were formerly—and I believe still are—in great request with anglers for making a particular salmon-fly. The Welsh for Bittern is, like most other Welsh names, wonderfully descriptive, *viz.*, "Aderyn-y-bwn" (the bird with the hollow sound), from "bwmp," a hollow sound; hence probably the English word "boom," so generally applied to the noise made by the bird.

The Little Bittern, *Botaurus minutus*, so far as I can learn, is unknown in this county, for after numerous enquiries I am unable to record any instance of its occurrence here. It is possible, however, that being only an occasional summer visitor, it has, from the nature of its haunts and its shy retiring habits, hitherto escaped observation.

WATER RAIL, *Rallus aquaticus*.—Remains with us all the year round, and may be very generally found in all the marshy places of the county; it is seldom seen, on account of its skulking habits, but it is far more common with us than is generally supposed. It counterfeits death exceedingly well. In shooting round a lake near here, I flushed a Water Rail close to me. I fired, and down fell the bird. On picking it up, it lay in my hand for some minutes motionless, and to all appearance dead. I was looking for a shot-mark, when suddenly, as I looked away for a moment, without the slightest warning, it flew off. I was so surprised that I could hardly believe my eyes. My dogs moved the bird twice afterwards, but I gave the clever little fellow the liberty it had so well earned. The late Mr. Marsh used to say that dogs hunt the Water Rail with greater avidity than any other water bird, when once it has been killed to them; and I have found this to be the case, several dogs I have had taking the greatest pleasure in hunting them. Some years ago I had a fine stuffed

Bittern with a skeleton of a Water Rail which had been taken from its crop after it had been killed.

LANDRAIL, or CORN CRAKE, *Crex pratensis.*—Fairly plentiful, but I have never seen them in any numbers. In August and September they are often found on the hills, where I think they resort before returning. They are not nearly so plentiful with us as in England, and I think have decreased in numbers of late years. Here again the Welsh name, "Ysgrech y gwair" (the screamer of the hay), is most expressive, the word "ysgrech," as pronounced in Welsh, being a good imitation of the cry of the Corn Crake, and preferable in this respect to our word "crake."

SPOTTED CRAKE, *Crex porzana.*—A regular visitant, but very local. On many large bogs in this county it is never seen, on others it is invariably to be found. On the numerous bogs on the Eppynt Hills, over which I had the privilege of shooting for many years, I have never seen it, whilst on the Trath, a large bog on Mynydd Illtyd, near Brecon, it is to be found every year; but the favourite spot for them in this county is in the large bog near Onllwyn, and here in the early part of the shooting season I invariably flush several, and many breed in this place. I one day flushed six and killed four, three of which were birds of the year. The station-master who was then at Onllwyn informed me that there were two broods of them hatched in that part of the bog close to the station that year. This is an enormous bog, the middle of it being very deep, and about half a mile of it absolutely unapproachable, thus forming a secure retreat for many water-birds. From the thickness of the reeds it is almost impossible to beat this stronghold of the Spotted Crake with dogs, and many have been lost in attempting it. I generally find them where a warm spring or two runs in a little rivulet through the centre of a bog, and they greatly frequent this part. The flight of the Spotted Crake varies greatly, sometimes, like the Moorhen, flapping slowly out with its legs hanging straight down; at another time tucking them up under their bodies, and flying with all the speed of, and very similar to, a Quail, and the more the autumnal season advances the stronger I fancy they fly. I have never seen one after October. I once had one alive in my hand, a winged bird that my dog caught before it could escape into the reeds; its eye was a brilliant olive-green, and exactly matched the colour of its legs. I mention this because bird-stuffers invariably return you the bird with a red eye. Like all the Crakes, it is very difficult to flush the second time, but dogs hunt it with the same eagerness that they do the Water Rail. It has been killed on some of the bogs near Cray, and its nest and eggs have been taken on the Trath, near Brecon. Mr. Dilwyn Llewellyn tells me that in the fall of the year he can at any time move three or four in some bogs in Glamorganshire. Of course, as in the process of time many of our larger bogs are drained, the area used by this bird must necessarily get smaller until it ultimately has no place to breed, but I hope that the county will yet afford this graceful and elegant little visitor a safe breeding place for many a year. May not its exceeding rarity in many parts of England arise from this cause? The late Mr. Marsh told me that he had seen it twice in his life, and those were days to be marked with a white stone. I never kill one now except to oblige a brother naturalist. I may add that I have never seen it on any of the bogs near Llanwrtyd, which bears out my observation as to its partiality for particular localities. It has also been obtained near Hay, on the other side of the county.

MOORHEN, *Gallinula chloropus.*—Very general everywhere, except on our rivers and brooks. Though plentiful on the Brecon Canal, and on all our lakes and ponds, especially Llangorse Lake, it is hardly ever seen on bogs on the hills, preferring water where it can swim and feed in quietude, and this it is unable to do on rapid streams.

COOT, *Fulica atra.*—Very common on Llangorse Lake, where it breeds, as it does also on a few other smaller lakes in the county; but the large number of Coots that appear in the early part of the winter are migrants from other parts. I think it is increasing of late years, and since the Gludy Lake, near Brecon, has been looked after, it has become much more numerous there. This would also be the case at Llangorse Lake, but for the constant fusilade which takes place there every year directly the shooting season opens (August), and which must inevitably drive away every bird from its waters. It is worth remarking that on our deep hill-bogs the Coot is never found, and only occasionally the Moorhen. On the Onllwyn Bog, before mentioned, I have never seen either of these birds, and this is, I should think, the largest and deepest bog in the county, as well as the most dangerous.

(To be continued.)

THE SEVERN SALMON—WHENCE IT COMES AND WHERE IT GOES.*

By Francis Day, F.L.S., F.Z.S.

There was a time when the "King of Fresh-water Fishes" so abounded in England that the friends of every intending apprentice were careful to cause a stipulation to be inserted into each bond of apprenticeship that the lad should not be compelled to dine off Salmon more than two or three days in a week. The rivers wherein these fish were born, reared, and nourished still remain, but scarcity of the article (as demonstrated by its market value) shows that at the present time there is a woeful falling off in the supply. How many among us, may I ask, have witnessed the capture of a Salmon in the Severn off the ancient city of Gloucester? Is it not a fact that the fishery there gives but little comparative employment to the fishermen, sport to the angler, or food to the town? It may well be said of the Salmon—

> "They come like shadows, so depart."

We all know the appearance of a good healthy fish when we see it exposed for sale, and are cognisant of its taste when served at table; but how few of us are aware of the many and strange adventures it has passed through before it has reached a sufficient size to reward the net-fisherman's toils, or attained to the dignity of appearing at an aldermanic feast! I propose to consider its life-history—that is, its eggs in the nest, the parr or young in our rivers, the smolt as it assumes its silvery migratory dress, the grilse which returns from the sea to our fresh waters (mostly during the summer months), and the adult Salmon that, residing in the sea, ascends our streams at certain periods in order to deposit its eggs and maintain, so far as it is able, the continuation of its race.

The eggs of the Salmon are small, round, elastic bodies, of a clear white, pink, or even coral colour. Owing to their tough outer coat, they are very elastic, as may be seen by throwing one on the ground, from which it will rebound like an india-rubber ball. This strength and elasticity must be an important property, if we remember where these eggs are deposited and what an amount of pressure they may have to undergo. Young Salmon are hatched from eggs deposited in rivers, such as the Severn—not near its mouth, where the tide or the current would be too strong for the baby-fish to live in, but in small and often mountainous streams, where the water is pure and shallow, having a gravelly bed which permits the redd, or nest, to be constructed, while deep pools in the vicinity allow the breeding-fishes to retire into them for rest.

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* Abstract of a paper read at the Gloucester School of Art.

The places selected by fishes for depositing their eggs vary in different families. Thus the ova of the Cod floats on the surface of the sea until the young come forth; that of the Herring sinks to the bottom, where, by means of a glutinous substance, it becomes attached to sea-weeds, rocks, or other objects. One form of Sea-sucker (*Lepadogaster*) attaches its eggs to the inside of an old shell, as a butterfly does to a leaf. The Perch in our fresh waters have stringy ova, which is made fast by one end to some stationary object, as grass or timber. That of some species of Carp sinks into the mud of ponds; while a few of the tropical scaleless Siluroids that reside along the coasts have this remarkable peculiarity, that the male carries the eggs about in his mouth until the young are hatched. Our Common Stickleback forms a veritable nest, which is attached to a water-plant, and this nest has one hole by which the fish enters and another on the opposite side by which it emerges.

But none of the foregoing plans are followed by the Salmon, which ascends our rivers to a suitable spot, and in the gravel at the bottom of the stream constructs its redd or nest, which work seems to be the occupation of the female. She lies on one side, and, by moving her tail rapidly from one side to the other, fans up the gravel until she rapidly sinks into a kind of trough, the male remaining near ready to give battle to any intruder, for which purpose his lower jaw is furnished at this period with an offensive weapon in the shape of a cartilaginous, hook-like process. The female (waited upon by the male) now deposits her eggs in the trough she has made in the gravel, and these are subsequently covered to some feet in depth, the whole forming a redd. She now falls back into one of the deep pools until she has acquired sufficient strength to deposit more eggs. During this period Salmon (like Shad and many other fishes) are indisposed to feed, and live on the stock of fat they have laid in while at sea. It has been computed that every female Salmon deposits about 900 eggs for every pound of its weight, and that only 900 of these in every 17,000 shed in British rivers ever attain the parr stage. As might be anticipated, eggs deposited in a running stream are very liable to be carried away by the current, and, as I shall presently show, the places selected by Salmon for their redds are precisely the localities where Trout have previously deposited their eggs, which now become routed up and carried away down stream to be devoured by every hungry fish.

The length of time the eggs remain in their nest before they are hatched may now be considered. This is subject to variation as great as from 50 to 128 days, which last period occurred at Stormontfield on the occasion of a very severe winter. Acting upon previous experience, Mr. Youl succeeded in transmitting Salmon-eggs to the Antipodes in small boxes packed in ice, which retarded hatching until the 145th day. Mr. Branden examined a redd that appeared to have been left dry, but on opening it found that a little water was trickling through the stones and gravel, which was sufficient to keep the ova healthy. Having scraped a hole he obtained a considerable number of eggs, and these he transferred to a pail of water, where two-thirds hatched within periods varying from five minutes to twenty-four hours. About a week subsequently he returned to the same spot, and had another dig for Salmon-eggs, no rise having occurred in the river during the interval. He collected more, and putting them into the water they hatched, as the former ones had done. He very fairly suggests that this may be a wise provision to prevent ova deposited in localities where the depth of the stream is liable to considerable fluctuations from becoming lost or destroyed, which must occur unless some delay be provided for; for as the floods come and sweep up these redds, the imprisoned ova are let loose at a time when they are ready to burst and the young to emerge.

But Salmon-eggs, even in redds, are not permitted to rest in peace and hatch in security: they have many accidents to escape from and numerous enemies whose vigilance must be avoided. Not only may floods prematurely sweep away redds with their unripe eggs, but during the continuance of such high waters spawning fish are unable to occupy their usual breeding grounds, because they are too deep in the water. They consequently may have to shed their eggs in the stream, where they become lost, or push higher up to where there will be more chance of their redds being left dry and the ova perishing; even in their annual spawning grounds, where their eggs may have been deposited, severe seasons of drought may occasion most disastrous results. Irrespective of season, the eggs have numerous water enemies, as Fresh-water Shrimps, which hunt out the nest, where they are as merciless to the eggs as Rats are to corn in a granary. The larva of the May-fly and of the Dragon-fly, and even some birds, cannot be deemed innocent of joining in this great work of destruction; while Swans and Ducks enjoy nothing so well as the spawn of fishes, in which taste the Vole or Water Rat appears to coincide. In consequence of the many destructive agencies at work, an ingenious plan of artificial hatching and rearing has been adopted with great success. By regulating the water, droughts and floods are prevented, and many enemies are excluded which run riot among fish-eggs left in a state of nature in our rivers.

Supposing all to have gone well with the eggs, and some young fish hatched, it does not follow that the fry are always strong and healthy. The temperature of the water ought to range out of doors about 40° or 45°, for if it should rise to 50° the eggs may become prematurely hatched. The higher the temperature the sooner the young appear, and the more weakly they may be expected to be: sometimes the jaws are deformed in the fry, or the spinal column is curved; even two fish may be connected together, like the Siamese twins; again, two or even three heads have been seen attached to one body. When the young fish emerge from the eggs they have a large bag, the umbilical vesicle, attached to their stomachs: this contains the nourishment which is to serve them for several (three to eight) weeks' subsistence, and they do not commonly take in any food by the mouth until it is absorbed. Weighed down by it, they lie quietly among the stones at the bottom of the stream, and seek concealment from fish larger than themselves, aquatic insects, and other enemies which would at once commence to feed on them.

When the fry has become an ounce or so in weight, it is commonly known in our river as the "last spring" or "parr." Its colours are very similar to those of its relative the Common Trout. Several so-called "finger marks" appear down its sides, and numerous scarlet spots are scattered over its body. Many discussions have arisen to prove or disprove this being the young Salmon, and it has been pointed out that in rivers destitute of Salmon there are no parrs, and where parrs exist there are Salmon. The question is now set at rest by eggs having been taken direct from Salmon and artificially hatched, the young produced being parrs. The parrs in their second or third year, about the month of May, begin to be restless, assuming a silvery or smolt dress, and, assembling in shoals, drop down the river towards the sea. Here again it has been asserted that smolts are not parrs. A number of the latter were placed in a freshwater tank in the Brighton Aquarium, and when the month of May came round all but four assumed the silvery livery of the migratory smolt. Sea-water was now gradually introduced, when all became smolts!

We have now traced the Salmon-eggs to the fry, these to the Trout-looking parr, and the latter to the silvery smolt that descends to the sea. These smolts when reappearing from the sea, do not present the same appearance as when they entered it, but assume a larger form, weighing more pounds than they did ounces—miniature Salmon, termed "grilse," which ascend in shoals. These by popular repute were the intermediate stage between the smolts and the Salmon, being supposed to be those forms which descended to the sea, where they remained one or two seasons and then returned, mostly to the river where they were originally bred. Russell tells us that of all the smolts which were marked by the attachment of rings, or other effective means, none were obtained until the second year, or fifteen months after they had been turned loose. These "grilse," or young Salmon, ascend from the sea, and some of them breed, but do not deposit so many eggs as do the old Salmon: after a time they descend again as grilse-kelts, coming back subsequently from the sea as Salmon.

Salmon enter our rivers in varying numbers throughout the year, unless impurities (as in the Thames) have annihilated the breed. At certain times, as during the cold season, they ascend the Severn for the purpose of reaching their spawning-beds, and having deposited their eggs in the redds, as described, they descend to the sea in a miserable condition, many of the males succumbing from exhaustion. At this period the female fish is known as a "shedder" or "baggit," and the male as a "kipper," but speaking generally they are termed "kelts." Such fishes, as might be expected, are positively unwholesome.

Let us follow our Salmon stage by stage up the Severn, past the city of Gloucester, where laws against polluting the river are not in force, to the weirs at Tewkesbury and elsewhere, which the fish can only cross at high floods. Here the poachers prey upon them at every obstruction; and disease, due to contagion, conjoined with filth, carries off numbers. But irrespective of the physical difficulties they must experience in surmounting natural or constructed obstacles (as weirs), the Salmon has many other dangers to contend with. First, and foremost, are those of pollutions of the river-water. Drains, manufactories, and water mines, are wholesale causes of destruction, more especially to young fish. During the last few seasons I have collected some of the accounts recorded respecting poisoning fish. A poacher having placed some chloride of lime in an old stocking, sunk it in a sluggish stream, and killed many Trout He was convicted and punished, I suppose, as a *retail* sinner, for it was lately recorded in 'The Field' that the proprietors of a large paper-mill, on the Cray River, have obtained a special Act of Parliament to permit them to discharge the same poisonous substance into that river, where they would be *wholesale* destroyers. The washings of bags which have contained artificial root manure, or bones dissolved in sulphuric acid, have been known to kill all the fish in a pond; the self-same substance, to the extent of two or three cwt. to an acre, is often employed in fields contiguous to rivers, into which much of it would obtain access were a sudden storm to occur immediately subsequent to its employment. The washing of sheep, from the drugs employed, has also been observed to poison the water.

An old gas-tank was drained into a sewer, and from thence obtained access to the River Roden, poisoning the fish for miles. Peat-water, or the bursting of peat-bogs into rivers, has produced similar results. Not only does the presence of pollutions in rivers concern the owners of fisheries, the fishermen who have to earn their living, as well as the consumers of fish, but it also raises the very interesting home-question of how such pollutions operate upon the dwellers residing on its banks? Does not the stream thus rendered unfit for domestic purposes drive the public to purchase and consume other and apparently less tainted fluids? On this point Salmon and other fishes play a most important part by demonstrating whether the water they reside in is sufficiently pure to sustain their lives, for if not, it stands to reason that human beings and cattle that may incautiously partake of it may be doing so to their own destruction. Anybody may pollute the Severn at Gloucester where it is tidal, the authorities declining to consider it a stream, and thus it escapes the provisions of the Rivers Pollution Act!

We are now in a position to enquire why it is that the interests of the proprietors of Salmon fisheries are not identical throughout the entire extent of the river, and also to consider whether this clashing of interests is not inimical to the fisheries, and consequently to the general public? The proprietors of fisheries living on the higher waters may fairly argue that from Tewkesbury to the sea pollutions are permitted unchecked access, that immoderate netting is almost continuously carried on, giving the fish, except in close time, but little chance of escape. Thus the upper proprietors see but few fish, excepting during the breeding season, when it is illegal to capture them. They are, in a manner, "clucking hens," whose duties seem to be to take care the eggs are hatched, rear the fry, and "speed the parting guest" as it descends to the sea, from whence nets and other obstructions, and pollutions in the lower reaches of the Severn, will most probably prevent their ever re-ascending, or only in sufficient numbers to maintain a supply for the lower waters. Official statistics are worse than useless—they are positively misleading; for they ought to show the yearly quantity of Salmon taken in each portion of the river—not the number of boxes of Severn Salmon received at Billingsgate. Can it be a source of surprise if the breeding grounds are not strictly preserved? For the rearing of Salmon is effected at the expense of the local fish, which are residents of the upper waters. Take the Trout as an instance: it has constantly been observed that a Salmon river is not, as a rule, well stocked with Trout. Several reasons have been advanced to account for this, but the most prominent seems to be that the Trout breeds some little time earlier than the Salmon, and deposits its eggs in the identical spots that the Salmon likewise selects. As the Salmon turns up the gravelly bed, in order to form its redd, it disturbs the previously deposited Trout eggs, which are then carried down stream by the current, and afford a repast to every fish in the vicinity.

The Salmon is rare in the Severn in comparison with the number of fry hatched there, and which would be quite sufficient to form a good supply had they a chance in the battle for life in the lower waters. The paucity of these fish is due to three main causes, excluding poaching:—(1) Difficulty in the ascent of breeding fish, owing to natural or artificial obstructions in the river; (2) immoderate netting; and (3) pollution of the water. The present policy of masterly inactivity against the great destroyers of the Salmon, aided by local activity against the petty ones, are characteristic of our fishery laws and regulations, and will probably form a subject for marvel to the antiquarians of future ages, when naturalists will perhaps observe—" What could have been expected from a legislature that left the young fish to take care of themselves, but protected the useless birds which destroyed them, and concluded every Parliamentary Session by dining at Greenwich off 'whitebait,' the fry of the Common Herring?"

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

By John T. Carrington, F.L.S., and Edward Lovett.

(Continued from p. 185.)

Thia polita, Leach.

This rare species is described by Bell in the Appendix to his work, at the time of writing of which very little seems to have been known as to its habitat; though it seems probable, according to M. Milne-Edwards, that it is a Mediterranean form.

The carapace is somewhat shaped like a thumb-nail, but produced posteriorly; it is rarely quite an inch in length, and nearly as broad in the widest part; it is remarkably smooth and polished, and fringed with fine downy setæ. The antennæ are about a quarter of an inch in length, and slightly plumose.

The anterior pair of legs are robust, rounded and smooth, the forceps curved; the legs are capable of being closed in beneath the carapace. The remaining legs are hairy and rather short, the fourth pair being the shortest. The abdomen is five-jointed in the male and seven-jointed in the female, and in both fringed with setæ. Its colour is white, with a faint greenish tinge; but specimens are not unfrequently found of a delicate pink suffused over the whole of the carapace, whilst the legs are of the normal white colour. There is often a circular spot of red on each side of the carapace, over the branchial region, which greatly varies in size, and which is quite absent in some specimens.

According to Bell, this species is only recorded from Galway, where it was first discovered about 1857. We have obtained it in somewhat considerable numbers from Jersey, where it is found buried in the sand, being similar in habits to the next species.

This has been called by Jersey fishermen the "Thumb-nail Crab," the only popular name we evei heard for the species.

Corystes Cassivelaunus, Leach.

This species, again the only one of the genus known to inhabit our seas, is popularly known as the "Masked Crab," from the resemblance of the marking of the regions on the carapace to a human face or mask. It is a remarkably interesting species for several reasons, and may be described as follows:—

The carapace is much longer than broad, somewhat cylindrical, and approaching in form the carapace of the *Macroura*. It is about an inch and a half in length and about half that in width, roughly oval in shape, and armed with three spines on each lateral margin. The orbits are large, and the space between them is notched. The antennæ are very long, being nearly as long as the carapace, and slightly plumose.

The anterior pair of legs are remarkably long in the male, but only about a third as long in the female; they are rounded in form, and enlarged at the base of the forceps, which are serrated and hairy; the wrist is armed with spines. The remaining legs are somewhat compressed, and slightly fringed with setæ on both margins. The abdominal somites are five in number in the male and seven in the female, narrow in the former and, as usual, broader in the latter.

The ova are small, and resemble that of *Carcinus mænas;* they are exuded in the spring-time, and are a dull yellowish brown, becoming very interesting under the microscope as the formation of the enclosed zoæa proceeds.

The colour of this species is a pale yellowish white, often, however, tinged with red.

Corystes Cassivelaunus is a rather deep-water species, usually found in the laminarian zone; and appears not to have occurred very commonly when Bell wrote his work. He records it from Wales, Torquay, Sandgate, Scarborough, Hastings, Cornwall, and also from Ireland. We have obtained it from Weymouth, Teignmouth, Torbay, and in considerable numbers some distance off the Sussex coast, where it was also thrown upon the shore in thousands during the great storm of January, 1881.

(To be continued.)

OCCASIONAL NOTES.

Pine Marten and Polecat in Lincolnshire.—I have much pleasure in recording the occurrence of the Pine Marten near Bardney, in Lincolnshire; the specimen (which I have just seen at Mr. Barber's, taxidermist, Lincoln, and which he asked me to record) was caught in a trap a few weeks ago: it was unfortunately very much mauled by dogs. As many inquiries have been made lately in various quarters as to the extinction of this animal in Lincolnshire and other districts, the capture is very interesting. A Polecat was taken near Grantham two or three months ago: this animal seems to be becoming very rare in this district.—W. W. Fowler (Lincoln).

Notes of the Nuthatch and Lesser Spotted Woodpecker.—The correspondence recently published in 'The Zoologist' on this subject, taken in connection with a letter received a short time since from Mr. J. H. Gurney, jun., and a conversation with Prof. Newton, convince me of the great difficulty—to say no more—of attempting to translate into words the sounds made by many birds or other animals. In my communication (Zool. 1882, p. 149) I took it for granted that Mr. J. Young and I were alluding to the same note or sound, described by him as "churring," a sound he attributed (*l. c.* p. 113) to the Nuthatch, but which I believed to be that of the Lesser Spotted Woodpecker. Mr. C. B. Wharton (*l. c.* p. 189) is confident that the sound we allude to is that of the Nuthatch, and wonders why we should call it "churring"! It seems now to me more than probable that we are all three of us alluding to different notes, and therefore possibly to different birds as their cause. I will not add to the evident assumptions and confusion of the matter by attempting to give a name to the sound I mean. I certainly should never myself have called it "churring," nor should I, in a manner, have adopted it from Mr. Young, had I not then been convinced that no note I ever heard from the Nuthatch could be so translated, while the jarring note of the Lesser Spotted Woodpecker—so very familiar to me—might by possibility be so called. The note I have had, and still have, in my mind is that of the latter, and not of the former bird: and, so far as my own experience goes, the two birds have no single note in common; nor, when heard, liable to be mistaken for each other's by anyone who has had sufficient opportunities of verifying the producer. Although, however, I will not venture to translate the sound I allude to, I may remark that it can be fairly reproduced by drawing a piece of hard stick rather quickly across some wooden palings not set too close together; in fact, by so imitating it I believe that in several instances the attention of the bird was drawn, and that I was thus enabled to induce it to continue tapping, and so to discover its position. Prof. Newton and Mr. Gurney will, I know, forgive my here alluding to them without their formal consent. The latter, writing to me on the subject, assumes that he is referring to the same sound as myself, and asks if I do not think it is like that of the Wryneck! stating his belief that "some of the Wrynecks recorded in March were only Nuthatches." This seems to me to prove that the verifying of the notes of birds is a matter at present beset with, at any rate, some little difficulty and confusion, quite apart from the attempt to translate the notes when verified. On this last point it is that Prof. Newton's observations are instructive to me. In part xiv. of his new edition of Yarrell's 'British Birds' (I have not the part by me at this moment) Prof. Newton translates the ordinary cry of the Lesser Spotted Woodpecker by the words, "kink, kink." The cry of this bird, which I should call the *ordinary* one, is very familiar to me, but those syllables are about the last by which I should ever have thought of describing it. It bears a certain resemblance to that of the Green Woodpecker—very much weaker, of course, and also less clear and resonant. I understood Prof. Newton to agree with me that, besides the jarring spring note, the Lesser Spotted Woodpecker is only known to utter the one in question, and I allude to it here merely to "point the moral," that if "kink, kink" sounds to him like this cry, the attempt to translate obscure notes of birds into ordinarily intelligible language is almost hopeless, and will probably prove misleading.—O. P. Cambridge (Bloxworth).

Uncommon Birds in the Isle of Wight.—I am informed by Mr. Dimmick the Ryde naturalist, that a Great Grey Shrike was shot near Brading last October; a Great Northern Diver, in November, off Ryde; a Red-breasted Merganser, in December; and a Red-throated Diver, in the same month, which was in a transition state of plumage, that of summer predominating. A Common Buzzard was procured in the neighbourhood of Ryde in December. Starlings were first observed about the roofs and chimneys in the town early in March, and Blackbirds were found to be nesting early in the same month, when its song was first heard. Young Thrushes were on the wing by the middle of April. The Chiffchaff was unusually late in arriving, none having been heard of till the beginning of April, nor did I see one till the 14th of the month. Though I am told that the Nightingale was heard towards the end of March at St. Lawrence, its song was not again heard till April 14th, a mild day, therm. 52° at 10 a.m. Swallows were rather late in arriving, none having been observed till the 14th April; they seldom remain on the coast on their arrival, as I have had occasion to point out in former notes. On the 20th April I did not observe one between Ventnor and Ryde, though the meadows on the Yar abound with them later on in the season. Rooks had returned to their nesting trees in the village of Bonchurch by the first week in March.—Henry Hadfield (Ventnor, Isle of Wight).

Breeding of the Short-eared Owl in Suffolk.—One if not two pairs of the Short-eared Owl, *Asio accipitrinus*, have bred this season in Tuddenham Fen. In the fourth edition of Yarrell's 'British Birds,' the year 1864 is stated to be the latest known to the Editor in which this bird nested in the Eastern Counties; and nothing is there said of this bird's habit of placing its young, soon after they are hatched, one here and one there within a radius of about twenty yards of the original nest. By the side of one of the young ones so placed in Tuddenham Fen was a full Snipe.—W. T. Angove (Mildenhall, Suffolk).

[Our correspondent appears to have overlooked the fact that the third part of the fourth edition of Yarrell's 'British Birds,' which contains the account of the Short-eared Owl to which he refers, was published ten years ago—February, 1872. Since then this bird has been reported to have nested again in the Eastern Counties. For instance, Mr. Christy last year reported a nest in Wicken Fen, Cambridgeshire (see Zool. 1881, p. 336), and Messrs. Clarke and Roebuck, in their lately published 'Handbook of Yorkshire Vertebrata,' refer (p. 41) to the occasional nesting of this Owl in their county.—Ed.]

Teal and Redshank breeding in Yorkshire.—Allow me to record the finding of the eggs of the Teal on Strensall Common, on Easter Monday, which is exactly a year since I recorded the last taken there. The nest contained nine eggs, and, unlike that previously recorded, was in the immediate vicinity of water. The nest was visited twice, and each time the bird allowed a near approach before quitting the eggs. A friend of mine also purchased in a poulterer's shop here four eggs of the Redshank, taken in the vicinity of Melbourne, near York. On Easter Monday I procured five eggs of the Little Grebe or Dabchick on Strensall Common; the eggs were, as usual with this bird, completely covered up. Since this note was written I have found three more nests of the Teal. That many nests of this bird should be found in the same locality is an unusual occurrence. I may add that since the breaking up and enclosing of Riccall Common, several pairs of Black-headed Gulls, *Larus ridibundus*, now breed on Strensall Common.—W. HEWETT (Clarence Street, York).

CURIOUS CAPTURE OF A GREAT BLACK-BACKED GULL.—Thomas Sorrell, naturalist, of Old Humphrey's Avenue, Hastings, informs me that he had a Great Black-backed Gull, *Larus marinus*, brought to him at the end of February, which had been obtained in a very singular manner. The bird dived down into the hold of a fishing-smack, at sea, which was half full of Whiting. The men on the smack surrounded the hold, snatched at and secured the bird as it came up. They killed it and brought it to Sorrell, who tells me that it was an old male in fine plumage, the stomach full of half-digested Whiting. It hardly seems as if hunger could have made it endanger its life in such a strange manner.—THOMAS PARKIN (Halton, near Hastings).

NESTING OF THE LONG-TAILED TITMOUSE.—Mr. C. B. Wharton (p. 187) asks other observers at what height from the ground the nest of the English Long-tailed Tit is usually placed. Although only three nests have come under my notice it may be as well to mention their position. The first was built at a height of about twenty feet from the ground, and although hundreds of other sites could have been chosen, it was placed in the fork of a tree, quite close to another tree in which was suspended a farm-yard bell, rung four times daily. The second nest was at the top of a very high Scotch fir, on an outer branch. My attention was attracted by observing the two birds flying about the nest. These two were at Tower Hill, Co. Limerick. The third I saw a few days ago, in an apple-tree, in the garden of my friend Mr. R. J. Ussher, of Cappagh, Co. Waterford. This nest, he told me, was eleven feet from the ground. I may mention that I saw on the 12th of this month (May) a family party of old and young Long-Tailed Tits flitting restlessly about in the Curraghmore Woods.—WILLIAM W. FLEMYNG (Portlaw, Co. Waterford).

NESTING OF THE LONG-TAILED TITMOUSE.—Referring to Mr. Wharton's enquiries on the above subject (p. 187), I write to say that a nest of this species is just being completed (May 6th) in an apple tree in my garden. It is placed eleven feet from the ground, at a point where a branch had been cut short some years since, among the offshoots that have sprung from the cut limb, and so artfully adapted to its surroundings, with the usual covering of silvery lichens, as to resemble a knob or excrescence of the tree. This is late for the Long-tailed Tit to commence breeding here. I have seen two other nests in apple trees in my garden, at a similar or greater distance from the ground; and a fourth nest in a hawthorn bush, which, as well as I remember, was but six or eight feet from the ground, but this was in an unfrequented island in my ponds.—RICHARD J. USSHER (Cappagh, Co. Waterford).

NESTING OF THE LONG-TAILED TITMOUSE.—Since writing my note on this subject (p. 187), I found in the New Forest, on April 27th, a Long-tailed Tit's nest containing eight eggs, and placed in a large beech-tree, exactly forty-five feet from the ground. Within two hundred yards of this tree was another nest, containing ten eggs, of the same species, but placed in the ordinary way in a blackthorn bush, and only four feet from the ground.—C. BYGRAVE WHARTON (Hounsdown, Totton, Southampton).

COLE TIT NESTING ON A WINDOW-SILL.—There is now (May 2nd) sitting on ten eggs, on a window-sill at Hoddesdon, at the height of about twenty-five feet from the ground, in a little box, a Cole Titmouse. Its perfect tameness and the extraordinary situation of the nest seem worth a record.—J. H. GURNEY, JUN.

FIRECREST IN OXFORDSHIRE.—The only example, so far as I can learn, hitherto recorded from this county, of the Firecrest, *Regulus ignicapillus*, was killed near Banbury, in December last. It appears to be an adult male, the crest being of a brilliant orange colour, and the lines on the face very distinct. The "remarkable yellowish green patch which pervades the shoulders and sides of the neck" (*vide* Rodd's 'Birds of Cornwall,' p. 42) is very noticeable.—OLIVER V. APLIN (Banbury, Oxon).

NORFOLK PLOVER IN CONFINEMENT.—The Norfolk Plover, the particulars of which were mentioned by my father in 'The Zoologist' last year (p. 381), lived five months, and died on the last day of December. I have more than once known them kept as late as this. It always sought concealment in the day-time, and its power of hiding was certainly curious. If its feet had not got diseased, from the soil of the garden, so different from its native heath, it would have lived all through the winter. Though Norfolk has always been considered the head-quarters of this species, it is not a common bird, and a very local one.—J. H. GURNEY, JUN. (Northrepps, Norwich).

MANX SHEARWATER IN JERSEY.—It may be interesting to place on record the recent occurrence of the Manx Shearwater (*Puffinus anglorum*) in Jersey. This is a rare bird in the Channel Islands, where it is regarded as an accidental visitor. It is omitted from Prof. Ansted's list of the 'Birds of the Channel Islands,' and Mr. Cecil Smith, in his 'Birds of

Guernsey,' only notices one specimen, which was killed near St. Samson's, in September, 1876. The example to which I have now to refer was picked up in St. Clement's Bay by a fisherman who was collecting Crustacea for me. It was perfectly fresh and in adult plumage.—J. SINEL (Bagot, Jersey).

WHITE-WINGED BLACK TERN AT SCILLY.—A specimen of this rare Tern has lately been taken at Scilly, and is now with Mr. W. H. Vingoe for preservation. So far as I can ascertain this is the first recorded occasion of its capture either at Scilly or in Cornwall.—THOMAS CORNISH (Penzance).

REMAINS OF THE GREAT AUK.—The discovery of the remains of the Great Auk, *Alca impennis*, in the Isle of Orensay, off the coast of Argyllshire, formed the subject of a paper by Mr. Symington Grieve, read at a recent meeting of the Linnean Society. The purport of his observations, which are of much interest to naturalists, will be found briefly noted in our report, in the present number, of the meeting referred to. In connection with this paper of Mr. Grieve's may be mentioned one by Dr. John Alexander Smith on the remains of the Great Auk discovered a few years since in Caithness. This very interesting memoir will be found in the 'Proceedings of the Society of Antiquaries of Scotland' for 1879 (vol. xiii. pp. 76–105, and 436–444), and deserves to be read *in extenso* by all who are curious on the subject of the former existence in the British Islands of this now extinct sea-fowl.

ON THE FOOD OF SEA FISHES.—An investigation into the food of sea-fishes is an indispensable preliminary to the framing of enactments applicable to marine fisheries, for at the present time we have but few established upon this all-important subject. On May 12th I received, in spirit, from Mr. Dunn, of Mevagissey, in Cornwall, the contents of the stomach of a single Herring captured there, with the remark that hundreds having been opened contained the same food. I found nineteen small Sand-launces, *Ammodytes*, varying from one and a half to two inches and a half in length, while the intestines of these young fishes are of a bright orange colour, due to the crustacean food they had been consuming. Last month Mr. Dunn sent me, in spirit, the contents of the stomachs of several Mackerel, which fish had appeared off Cornwall somewhat earlier this year than is usual. The food consisted of young Shrimps. A few days subsequently the fishermen reported to Mr. Dunn numerous fry of fish out at sea, too small to be captured by their nets. He proceeded to the locality indicated, and obtained many small but adult Shrimps, which were identical with those forming the Mackerels' food. I sent some to Mr. Norman, who identified them as *Thyranopoda Couchii*, Bell. The original examples when obtained by Couch were constituting at that period the food of the Mackerel, but they have escaped observation until about two years since. It seems very probable that these crustaceans may play an important part in the appearance of the Mackerel. It has been constantly remarked that Flatfishes, *Pleuronectidæ*, are decreasing around our coasts, the result of overfishing, and one of the remedies proposed has been that Soles under six inches in length should be returned to the sea. During the autumn last year I was along the Devonshire and Dorsetshire coasts, from whence a large number of small Soles are fished. I therefore closely investigated the subject, and though I found very large numbers of the young of the Common Sole, *Solea vulgaris*, were being wantonly destroyed, still the majority of these small ones belonged to the Little Sole, *Solea minuta*, which rarely exceeds three inches and a half in length, and the Thick-backed Sole, *Solea variegata*, which is generally about five inches and a half long. Should the proposition to make it penal to possess Soles less than six inches in length be passed into a law, then the two last-named species would escape capture, and most probably, as a result, increase in prodigious numbers. Here the question arises, Do all these forms feed upon the same food? because, if they do, such an enactment would be tantamount to preserving a form useless as human food, but which is consuming the sustenance required for the maintenance of our most valuable species.—FRANCIS DAY (Cheltenham).

HOLIBUT AT PENZANCE.—A Holibut, weighing about one cwt., was taken on hook and line (Spiller), in the Bay here, on May 15th. It is a rare fish in this district.—THOMAS CORNISH (Penzance).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

April 6, 1882.—Sir JOHN LUBBOCK, Bart., M.P., F.R.S., President, in the chair.

Mr. John Blaikie, Mr. C. C. Lacaita, Mr. J. W. Phillips, and Mr. John B. Wilson were elected Fellows of the Society.

Mr. Patrick Geddes exhibited and described a series of living specimens under the microscope, illustrating the presence of *Algæ* in Radiolarians and in certain forms of *Cœlenterata*.

Mr. Marcus M. Hartog afterwards drew attention to microscopic sections of *Cyclops;* and he demonstrated structural peculiarities in the eye of *Daphnia*, and compared it with that of certain other crustaceans.

Parts xiii. and xiv. of "Contributions to the Mollusca of the 'Challenger' Expedition," by the Rev. R. Boog Watson, were read. These comprised descriptions of new forms of the families *Buccinidæ* and *Muricidæ*. Other papers discussed were botanical.

April 20, 1882.—Sir JOHN LUBBOCK, Bart., M.P., F.R.S., President, in the chair.

The President, addressing the meeting, said that they would all, no doubt, have heard the sad news of the irreparable loss which Science, the country, and the Linnean Society have sustained in the death of Mr. Charles Darwin. Only a month ago they had the pleasure of hearing a paper of his—unhappily his last—which showed no sign of any abatement of vigour. That was not the occasion to speak of the value of his scientific work, but he might say that while the originality and profound character of his researches had revolutionized Natural History, he had also added enormously to its interest, and given—if he might say so—new life to biological science. Many of them, and no one more than himself, had also to mourn one of the kindest and best of friends. He begged to propose, as a small mark of respect to the memory of their late illustrious countrymen, the greatest—alas! that he could no longer say living—naturalists, that, after the formal business was concluded, the meeting should adjourn. The motion having been put was adopted in silence.

The Auditors of the Treasurer's accounts were then agreed to, *viz.*, Dr. J. Millar and Mr. H. T. Stainton, for the Fellows, and Messrs. R. M'Lachlan and A. W. Bennett, for the Council.

Sir Thomas D. Acland, Bart., M.P., was then elected a Fellow of the Society, and the meeting adjourned.

May 4, 1882.—Sir JOHN LUBBOCK, Bart., M.P., F.R.S., President, in the chair.

Dr. Cuthbert C. Gibbes was elected a Fellow of the Society.

A resolution of Council was read by the President, embodying the Society's sense of the loss sustained by the death of Mr. Charles Darwin, and expressing sympathy with Mrs. Darwin and the family in their bereavement, a copy of which was unanimously agreed to be forwarded to them.

A paper was read "On the discovery of remains of the Great Auk, *Alca impennis*, in the Island of Oronsay, Argyllshire," by Mr. Symington Grieve. A series of wing and leg bones of the bird were obtained, along with a various assortment of remnants of the Guillemot, Red-deer, Marten, Otter, Sheep, Rat, Rabbit, Common Seal, Pig, Wrasse, Mullet, Skate, Crabs, and several kinds of Mollusks. These were dug out of a large cone-shaped mound which the author believes must in early times have been occupied by man. The exceeding rarity of Gare-fowl remains in Britain gives a special interest to the record of their being found in these Western Scottish isles, and as associated with animals and other material giving evidence of the presence of man.

A communication followed from Mr. P. H. Gosse, dealing with the clasping organs auxiliary to the generative parts in certain groups of the Lepidoptera. After preliminary remarks the author mentions his mode of manipulation, and proceeds to a description of the organs in question, finally dealing with the modification of the apparatus as investigated in a very considerable number of species of the genera *Ornithoptera* and *Papilio*.

A paper "On the Ornithology of New Guinea," part viii., by Mr. R. Bowdler Sharpe, was read. This contribution comprised the results of collections made by Mr. A. Goldie in the districts at the back of the Astrolabe Range in South-East N. Guinea, and by Mr. Charles Hunstein on Normanby Island, on the south shore of the mainland of the China Ghauts, and on the banks of a river at the end of Milne Bay.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

May 2, 1882.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

After the Secretary had read the minutes of the previous meeting, the President said,—"The minutes just read recall the fact that at our last meeting we were honoured by a communication from Mr. Darwin, probably his last contribution to that science to which he devoted his life-long labours. No one who heard that paper—showing as it did no sign of faltering from that eager interest which he had always manifested in a subject which he had made peculiarly his own—expected that not twenty-four hours would elapse before those labours would be brought to a close. During the fortnight that has passed the whole world has been moved at the loss it has sustained, and his work and his character have, more than any other theme, filled the minds of thinking people of all countries, classes, creeds, and occupations. We who humbly follow him in cultivating the science he adorned must feel elevated at the sight of the full recognition accorded to his work. The general acceptance of Darwin as one who has exercised a powerful influence upon the whole realm of human thought, the cordial reception of his remains in our magnificent Abbey, among the illustrious men of whom our country is proud, are triumphs in the history of Zoology, for it was mainly zoological observation which led to those philosophical speculations which have made his name famous. The nation's grief at his loss has already found eloquent and feeling expression in many quarters: the resources of our language seem to have been exhausted in bearing testimony to his worth. No words that I could find would add anything to what has been so well said by others; and surely here, if in any place in the world,—among those who are always occupied with subjects the pursuit of which has been so profoundly modified by his writings, and among many who loved him as a personal friend,—nothing is needed but to mention his name to call forth the strongest feelings of admiration for his work and reverence for his character. If it is not given to any of us to emulate him in brilliancy of scientific induction, or to light upon discoveries that will change the current of human ideas, we can at least endeavour to follow the example he has set us of patient perseverance in observation, scrupulous accuracy of statement, deference for the opinions and feelings of others, candour towards opponents, and of that invariable modesty and gentleness of demeanour which shed such a charm round his public as well as his private life."

Mr. Sclater exhibited a drawing of a Tapir presented to the Society by Mr. Fritz Zurcher in August last, which had been captured on the Yuruari River, in Venezuela. Mr. Sclater observed that in form and colour this animal seemed to agree better with *Tapirus Dowii* than with the ordinary *T. americanus*, and suggested that it was quite likely that the former species might be the Tapir of the northern coast-region of Columbia and Venezuela.

Mr. J. E. Harting made some remarks on the desirability of adopting a standard of nomenclature when describing the colours of natural objects.

Dr. Hans Gadow read a paper on the structure of feathers in relation to their colour, in the course of which he endeavoured to show how the optical appearances of the various colours met with in the feathers of birds were produced.

Prof. Flower gave an account of the cranium of a Cetacean of the genus *Hyperoodon*, from the Australian Seas, upon which he proposed to found a new species, *H. latifrons*.

A communication was read from Dr. O. Staudinger, containing the description of some new and interesting species of *Rhopalocera* from the New World.

A communication was read from Mr. H. J. Elwes, containing a description of a collection of Butterflies made on the Tibetan side of the frontier of Sikkim, amongst which were examples of several species new to Science.

A communication was read from Mr. Edgar L. Layard, describing a new species of Parrot of the genus *Nymphicus* from Uvéa, one of the Loyalty group, which he proposed to call *N. uvæensis*.

May 16, 1882.—OSBERT SALVIN, Esq., F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of April, 1882, and called special attention to the following birds, all of which were said to be new to the collection:—(1) A male Rifle-bird, *Ptilorhis paradisea*, in immature and worn plumage, changing very slowly into the adult dress, but apparently in good health; (2) a pair of Black-headed Tragopans, *Ceriornis melanocephala*; (3) four Rüppell's Parrots, *Pæocephalus Rueppelli*, from Western Africa; (4) a Western Black Cockatoo, *Calyptorhynchus naso*, conspicuously differing from the eastern *C. Banksi* in its smaller size; (5) a male Cabot's Tragopan, *Ceriornis Caboti*, making a fine addition to the gallinaceous series; and (6) two of the recently described Uvæan Parrakeet, *Nymphicus uvæensis*.

There was exhibited, on behalf of Mr. Henry Stevenson, a specimen of the Dusky Petrel, *Puffinus obscurus*, which had been picked up dead in the neighbourhood of Bungay, Suffolk, in April, 1858. (See Zool. 1858, p. 6096.)

A communication was read from the Rev. O. P. Cambridge on some new genera and species of *Araneidea*. Of the sixteen species described two were from Caffraria, one from St. Helena, two from Ceylon, and the remaining eleven from the Amazons.

Mr. W. A. Forbes called attention to a peculiarity recently observed in a young male specimen of *Pithecia satanas*, in which the third and fourth digits of both hands were completely "webbed."

Mr. Forbes also read a paper on certain points in the anatomy of the Todies (*Todus*), and on the affinities of that group. He dissented from the views of most previous authors as to the close affinities of these birds to the *Momotidæ*, considering that they must form a group by themselves, to be called *Todiformes*, of value equivalent to the *Pici*-, *Passeri*-, and *Cypseliformes* of Garrod. There were many grounds for supposing that *Todus* is a very ancient form, more nearly representing the ancestors of the whole group of Anomalogonatous birds than any other living form.

A communication was read from Mr. Roland Trimen, containing a description of an apparently undescribed Sun-bird obtained in the province of Mossamedes, South-Western Africa, which he proposed to name *Cinnyris Erikssoni*, after its discoverer, Mr. Abel W. Eriksson.

Mr. P. L. Sclater read some notes on a species of Duck, *Anas gibberifrons*, examples of which had recently bred in the Society's Gardens.

Mr. W. A. Forbes gave an account of some points in the anatomy of a rare Australian Duck, *Biziura lobata*, from examples that had recently died in the Society's Menagerie.—P. L. SCLATER, *Secretary*.